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scribe them for the practical needs of the entomologist. The homologies of the larval mouth-parts with those of other insects he does not discuss, though he apparently does not consider them to show such homologies; though Weismann regarded the mouth-parts of the muscid and other larvæ to be consolidated mandibles.

Brauer then lays down the characters of the dipterous larvæ in general, and discusses the value of the larval characters in classification. We have no space to condense the statements as to the characteristics of the metamorphosis of the different groups, or to present the convenient tabular view on p. 11. We note, in passing, that Dr. Brauer makes no reference to the Pulicidæ, which he evidently does not consider as Diptera; but with larvæ so closely resembling the encephalous larvæ (Mycetophilidæ), we do not see how some discussion of their affinities or even structure could well have been avoided in an essay of the scope of the present one.

Then follows a lengthy and interesting tabular view of the nervous systems of the larval as compared with the adult Diptera. This is succeeded by a section on the characters of the sub-orders and families; this occupies the greater part of the work, and is of prime importance. It is followed by short descriptions of a few larvæ of the families Tabanidæ, Leptidæ, Dolichopidæ and Empidæ.

The systematic list of descriptions of known dipterous larvæ with the bibliographical references (pp. 46-93), will be of the greatest use, especially to American entomologists; its compilation was a laborious undertaking; it appears to be very full and accurate, though we notice the omission of any reference to the description and figures of *Chironomus oceanicus* Pack., but such omissions must be few. The full index to the genera is a valuable feature. The plates, like all the author's artistic work, are excellent.

The Diptera are, without doubt, the most difficult order of insects, and Dr. Brauer, in giving us these results of ten years' labor on their larval forms, has laid entomologists under lasting obligations. The work will be of value to the systematist as well as to the economic entomologist, while the general biologist will find it a storehouse of facts bearing on the evolutionary problems of the day.

DECANDOLLE'S ORIGIN OF CULTIVATED PLANTS.¹—The aim of the author in this work has been to inquire into the condition and habitat of each species before becoming cultivated. Over how wide a range of inquiry, antiquarian, historical and botanical this has led the learned author, may be seen by glancing over the

¹ *Origin des Plantes cultivées*. Par ALPH. DECANDOLLE. Bibliotheque scientifique internationale, XLIII. Paris, 1883. 12mo, pp. 378.

footnotes. The number of cultivated species mentioned amounts to 249, but the author adds that by the end of this century there will be about 300 species out of 120,000 or 140,000 species of the vegetable kingdom; but this is more than in the animal kingdom, where out of "some millions" [*sic*] of species there are only 200 species of domestic animals.

The author remarks in the opening chapter that selection—that great factor that Darwin has had the merit of so happily introducing into science—plays an important rôle in agriculture once established; but at every epoch, and especially in the beginning, *the choice of species has more importance than the selection of varieties*. As to the earliest beginnings of the culture of useful plants in temperate Europe and Asia, the following extracts are of interest:

"In spite of the obscurity of the commencement of culture in each region, it is certain that the earliest date of cultivated plants is very different. One of the oldest examples of cultivated plants is, in Egypt, a drawing representing the fig, in the pyramid of Gizeh. The epoch of the construction of this monument is uncertain. Authors have varied between 1500 and 4200 years before the Christian era! If we suppose it to be about 2000 years, it will be an actual antiquity of 4000 years. But the construction of the pyramids could only have been carried on by a numerous people, organized and civilized up to a certain point, having, consequently, an established agriculture, which should make the antiquity much higher, at least some centuries.

"In China, 2700 years before Christ, the emperor, Chen-nung, instituted the ceremony in which each year he sowed five kinds of useful plants: rice, soja, wheat and two kinds of millet. These plants must have been cultivated for some time, in certain localities, to have attracted the attention of the emperor. Agriculture appears, then, to have been as ancient in China as in Egypt. The constant relations of this last country with Mesopotamia lead us to suppose the existence of a culture almost contemporaneous in the regions of the Euphrates and of the Nile.

"Why should it not have been as ancient in India and in the Indian archipelago? The history of the Dravidian and Malayan peoples does not go back very far, and presents some obscurity, but there is no reason to believe that agriculture did not begin among them a long time since, particularly on the borders of rivers.

"The ancient Egyptians and the Phœnicians have propagated many plants in the region of the Mediterranean, and the Aryan peoples, whose migrations toward Europe commenced somewhere near 2500, or at least 2000 years B. C., have spread about several species which were already cultivated in Western Asia. We shall see, in studying the history of some species, that already certain plants were probably cultivated in Europe and in the north

of Africa. There are some words of languages anterior to the Aryan, for example, Finnish, Basque, Berber and Guanch (of the Canary isles), which point to this conclusion. As to the remains called Kjökken möddings, the ancient stations in Denmark have furnished no proofs of the existence of agriculture, and likewise no proof of the possession of any metal. The Scandinavians of this epoch lived principally on fish, game and perhaps incidentally indigenous plants, like the cabbage, which are not of a nature to leave any traces in refuse or rubbish heaps, and which might have passed into cultivation. The absence of metals does not presuppose, in this northern country, an antiquity greater than the age of Pericles, or even of the prosperous period of the Roman republic. Afterward when bronze became known in Sweden, a region far removed from the civilized world, agriculture was completed by its introduction. There are found in remains of this epoch the carving of a plough drawn by two oxen and driven by a man.

“The ancient inhabitants of Eastern Switzerland, where they had instruments of stone and not of metal, cultivated several plants, some of which were natives of Asia. M. Heer has shown in his admirable work on the palafittes (lake-dwellings) that they had communication with the countries situated among the Alps. They could also have received cultivated plants through the Iberians, who occupied Gaul before the Celts. At the epoch when the lake-dwellers of Switzerland and of Savoy possessed bronze, their husbandry was more varied. It seems also that the lake-dwellers of Italy, when they had this metal, had a smaller number of species under cultivation than those of the lakes of Savoy, either from their higher antiquity or from local circumstances. The remains of the lake-dwellings of Laybock and of Mondsee, indicate a quite primitive agriculture—no cereals at Laybock and a single grain of wheat at Mondsee. The slightly advanced state of agriculture in this eastern part of Europe is opposed to the hypothesis, based on some statements of the ancient historians, that the Aryans had first sojourned in the region of the Danube, and that Thrace was civilized before Greece. In spite of this instance agriculture appears, in general, to have been more ancient in the temperate portion of Europe than we would be led to believe by the Greeks, who were disposed, like certain moderns, to make all progress originate from their own nation.”

The first chapter of Part I treats of how and at what epochs the culture began in different countries; the preceding extracts are from this chapter. In the second chapter the author concludes that in order to ascertain the origin of the cultivated species, we should combine botanical, archæological, palæontological, historical and linguistic methods.

The second part comprises most of the volume, and treats of the origin of those plants cultivated for their racemes, bulbs or

tubers; those cultivated for their stalks or leaves; those useful from their flowers or the parts enveloping them; fruits and grains. The third part is devoted to a résumé and conclusions, with valuable statistics.

The work is, of course, authoritative and is, moreover, exceedingly interesting. With it should be read the lengthy review of the work, by Dr. Asa Gray and J. Hammond Trumbull, in the *American Journal of Science* for April and May, 1883, containing valuable additions relative chiefly to American plants.

JACKSON'S VEGETABLE TECHNOLOGY.¹—This is evidently a most carefully prepared bibliography of economic botany, and must prove of great utility. The author purposely excluded all books devoted to silk and cochineal, as not being strictly within the limits of the title as settled by the Index Society; and "most reluctantly the subject of the vine, its culture and products, simply on the ground of its enormous extent." The bibliography of the vine, he adds, in all its bearings would require a lifetime for its compilation. He has also excluded books and papers of simply horticultural, therapeutic, chemical, commercial or manufacturing interests, unless they contained a sufficient account of the raw products, its cultivation or whence obtained to justify their citation. The author does not claim that the work is complete, saying that "a complete bibliography of economic botany would require the labor of years." The number of entries in the present book is 3580, exclusive of translations and different editions. The index fills nearly 100 pages, is comprehensive, and adds greatly, of course, to the usefulness of the work.

SMITH'S DICTIONARY OF ECONOMIC PLANTS.²—The scope of this work is sufficiently indicated by the title; it is not confined to the cultivated plants. The author was officially connected, for more than forty years, with the Kew Gardens, and was thus practically acquainted with the largest collection of living plants, exotic and native, ever brought together. In regard to those points which DeCandolle has worked out with such care, the present work is deficient, still it is a useful book, arranged in the form of an index or dictionary.

RECENT BOOKS AND PAMPHLETS.

Engelmann, Geo.—The mean and extreme daily temperature in St. Louis for forty-seven years, as calculated from daily observations. Ext. Trans. St. Louis Acad. Sci., Vol. IV, 1884. From F. E. Nipher.

Nipher, F. E.—On the expression of electrical resistance in terms of a velocity. Ext. Trans. St. Louis Acad. of Science, Vol. IV, 1884. From the author.

¹ *Vegetable Technology*. A contribution towards a bibliography of economic botany, with a comprehensive subject-index. By BENJAMIN DAYDON JACKSON. Founded upon the collections of George James Symonds. London, published for the Index Society. 1882. 8vo, pp. 355.

² *A Dictionary of popular names of the Plants which furnish the natural and acquired wants of man in all matters of domestic and general economy. Their history, products and uses.* By JOHN SMITH. London, Macmillan & Co. 1882. 8vo, pp. 457.